EXHIBIT 417

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UNITED STATES DISTRICT COURT

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NORTHERN DISTRICT OF CALIFORNIA, OAKLAND DIVISION

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STACIA STINER, et al.,

Case No. 4:17-CV-03962-HSG (LB)

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Plaintiffs,

DECLARATION OF SHELDON H. JACOBSON, PH.D. IN SUPPORT OF DEFENDANTS' OPPOSITION TO PLAINTIFFS' MOTION FOR CLASS CERTIFICATION

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v.

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BROOKDALE SENIOR LIVING INC. et al.,

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Defendants.

DATE: JUNE 16, 2022

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TIME: 2:00 P.M.

DECLARATION OF SHELDON JACOBSON IN SUPPORT OF OPP TO PLAINTIFFS' MTN FOR CLASS CERT /
CASE NO. 4:17-CV-03962-HSG (LB)

1   **<u>DECLARATION OF SHELDON H. JACOBSON, PH.D.</u>**

2   1.   I, Sheldon H. Jacobson, declare as follows:

3   2.   I am over the age of 18 and I am competent to testify to the matters stated in this

4   declaration. If called and sworn as a witness, I can and will testify based on my personal knowledge to

5   those matters set forth below.

6   3.   The declaration contains eight (8) sections. A list of these sections and the corresponding

7   page numbers are set forth in the Table of Contents immediately below:

I.   INTRODUCTION

4.   I was retained by Seyfarth Shaw LLP on behalf of Defendants Brookdale Senior Living Inc. and Brookdale Senior Living Communities, Inc. ("Defendants") to review and analyze Mr. Lewis Dale Schroyer's Discrete Event Simulation ("DES") model. Specifically, I was asked to analyze whether Mr. Schroyer properly conducted a DES model study in accordance with accepted simulation engineering standards and practices.

II.   QUALIFICATIONS

5.   I am currently employed by the University of Illinois at Urbana-Champaign as Founder Professor of Engineering in the Department of Computer Science and Director of the Simulation and Optimization Laboratory. I hold affiliate appointments in several departments, including Industrial and Enterprise Systems Engineering, Electrical and Computer Engineering, Mathematics, and Statistics, as well as the Carle Illinois College of Medicine. I have a Bachelor of Science and a Master of Science in Mathematics from McGill University, and I completed my PhD dissertation in Discrete Event Simulation ("DES") output analysis at Cornell University. I have taught DES courses at multiple education institutions almost every year since 1988. These are the type of courses that Mr. Dale Schroyer could have taken as an undergraduate or master's student.

6.   I have been involved in a number of complex litigation matters involving a range of issues, including healthcare simulation that involved expert testimony on DES Modeling.

7.   I have published 198 peer-reviewed articles, 11 book chapters, 50 conference proceeding papers, over 220 professional/editorial publications, and delivered over 510 presentations, seminars, and posters at conferences, universities, and research laboratories around the world. I have made several seminal research contributions, all focusing on applying operations research and advanced analytics to address societal problems of national interest. My research has been widely reported and communicated in the national press, including the *Washington Post*, the *Chicago Tribune*, the *Los Angeles Times*, and the *Boston Globe*, editorialized in the *New York Times*, and discussed in *Business Week*, *Forbes*, *Kiplinger*, and *The Osgood Files* on CBS radio. I have appeared on several television and radio programs, including CNBC's *Street Signs* and *The Closing Bell*, MSNBC's *Weekends with Alex Witt*,

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Washington Post Radio, *CBS This Morning*, and *CBC Canada News* (television and radio), and *BBC World News* (television and radio).

8.   I have also been recognized with numerous awards for my research and professional service, including the *Saul Gass Expository Writing Award* from the Institute for Operations Research & the Management Sciences in 2020, the *David F. Baker Distinguished Research Award* from the Institute of Industrial & Systems Engineers (Career Research Achievement Award) in 2017, the *Best Research Poster* (First Place) at the Association of Program Directors in Internal Medicine ("APDIM") Spring 2014 Conference, the *Award for Technical Innovation in Industrial Engineering* from the Institute of Industrial Engineers (with E.C. Sewell) in 2010, a *Guggenheim Fellowship* in 2003, and as a finalist for the *INFORMS Health Applications Section Pierskalla Best Paper Award* in 2004 and 2007. I am an elected Fellow of the American Association for the Advancement of Science (AAAS, 2020), the Institute for Operations Research & the Management Sciences (INFORMS, 2013), and the Institute of Industrial & Systems Engineers (IISE, 2011).

9.   I have served as a Committee Report reviewer for the National Academy of Medicine ("NAM") (2020), on the Organizing Committee for the NAM Workshop: *Medical Product shortages during Disasters: Opportunities to Predict and Prevent, and Respond* (2018), a Committee Member of the NAM Standing Committee for the Centers for Disease Control and Prevention Division of Strategic National Stockpile (2015-2017), a Panelist on the World Technology Evaluation Center (WTEC) for an International Assessment of Rapid Vaccine Manufacturing Study Group (2006 to 2007 and 2009 to 2010), a reviewer for a Centers for Disease Control and Prevention Panel Review (2006), a Participant in the NSF Healthcare Systems Engineering Workshop (2006), and an Associate Editor for the journal *Operations Research for Health Care* (2011 to 2012).

10.   I have written numerous peer-reviewed research papers on simulation, healthcare, and public health, including, but not limited to, numerous papers on discrete event simulation and its application in the healthcare industry.

11.   I have also written multiple peer-reviewed conference papers and key papers on numerous topics, including papers that surveyed sensitivity analysis in Discrete Event Simulation, a

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paper that surveyed health care applications in Discrete Event Simulation with over 1140 citations in Google Scholar, and a book chapter that surveyed health care applications in Discrete Event Simulations.

12.   My full curriculum vitae is attached as **Exhibit A** and details my extensive experience in the discrete event simulation, health care, and public health domains. **Exhibit A** is incorporated by reference herein and includes a list of all other cases in which, during the previous 4 years, I testified as an expert at trial or by deposition. My hourly rate for services rendered is $750 which is the rate I customarily charge for both consulting and testimony.

III.   BACKGROUND OF LITIGATION

13.   It is my understanding that thirteen (13) named Plaintiffs filed suit in federal court in the U.S. District Court for the Northern District of California on July 13, 2017, on behalf of themselves and three putative classes of residents who reside or resided at residential care communities for the elderly located in California. On behalf of one of these proposed classes of residents, Plaintiffs assert class-wide claims under the Consumer Legal Remedies Act and the California Elder Financial Abuse Act on the grounds that Defendants made alleged misrepresentations to residents about the staffing levels at the Communities and that Defendants allegedly failed to provide adequate staffing levels, thereby resulting in a "substantial risk of [residents] being denied care services on any given day." Plaintiffs' Motion for Class Certification at 1.

14.   On August 18, 2021, Plaintiffs filed their Motion for Class Certification, seeking to certify three separate classes. In support thereof, Plaintiffs filed the Declaration of Lewis Dale Schroyer ("Mr. Schroyer"), who purports to support Plaintiffs' class certification motion by conducting a Discrete Event Simulation ("DES") model built using ProModel/MedModel software. Mr. Schroyer's model was purportedly built on information received from Defendants, assumptions provided to him by his "subject matter expert" Dr. Cristina Flores, and data analyses performed by a Mr. William Blake Peters.

15.   Based on this alleged DES model, Mr. Schroyer contends that "extensive DES testing and failure analysis conducted by MedModel of 6 Brookdale facilities reveal[ed]" that the "selected facilities" (the "Six Communities") were (a) "systemically and significantly understaffed", (b) that "on

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average", the communities omitted 41.5% of the care time required to deliver resident care, and (c) that Brookdale's staffing methodology does not account for the actual distances and amount of time staff are required to travel in the communities each day to deliver care, "which on average requires 18.9% of the time in a work day." Schroyer Decl. at ¶ 31.

IV. BACKGROUND OF DES MODELING

16. George Box, the well-known British statistician, considered one of the great statistical minds of the 20th century, famously stated that "All models are wrong. Some are useful." This principle remains true today. At its base, a simulation provides a tool to experiment with possible scenarios of a real-world system under study (henceforth just labelled a system). A simulation model tries to imitate significant aspects of a system's behavior. A model is, in essence, a simplified abstraction that embraces only the scope and level of detail needed to satisfy a study's objectives.

17. A Discrete Event Simulation ("DES") model is a data generator. When one uses a DES model, its role is to generate data that can be used to measure the performance of the system being modeled. If one wishes to make inferences from the model's output about the system, a hypothesis must first be proposed and then tested. This is basic statistics. ████████████████████████████

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18. A DES model requires a set of input parameters (or just inputs). These inputs are used to create streams of random variates that are fed into a DES model such that when the DES model is executed, the hope is that it mimics the behavior of the system that the DES model is built to capture. This relationship is contingent on the model being rigorously validated and the code rigorously verified. As the DES model is executed, it generates a stream of random variates that can be analyzed to assess the performance or condition of the system. This means that the output of a DES model execution is a function of the input parameters. Therefore, as the inputs are changed, the output will also change. It also means that if the inputs are flawed, the outputs will also be flawed in terms of the ability of a DES model to provide informative insights into the system.

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19.   In general, DES models can provide general insights about real-world systems. Given that DES models are abstractions of an actual system, DES models cannot capture every aspect of an actual system. As such, this limitation on DES models means that unless the model is well-validated with reliable inputs, it will have little to no usefulness in providing insights into the real-world system. Any claims of high levels of precision and accuracy about system performance are misguided, though people who conduct DES studies may be prone to overpromise in this regard.

V.   INFORMATION CONSIDERED IN FORMING MY OPINIONS

20.   In forming my opinions in this case about Mr. Schroyer's DES Model, I relied upon the following information:

    a. Plaintiffs' Third Amended Complaint dated February 15, 2019;

    b. Plaintiffs' Motion for Class Certification dated August 18, 2021;

    c. Mr. Schroyer's Declaration In Support of Plaintiffs' Motion for Class Certification dated August 18, 2021 (ECF No. 277-5) (the "Declaration");

    d. Dr. Flores' Declaration In Support of Plaintiffs' Motion for Class Certification dated August 18, 2021;

    e. Mr. Schroyer's December 9, 2021 deposition testimony and documents referenced therein; and

    f. Dr. Flores' December 6, 2021 deposition testimony and documents referenced therein.

VI.   SUMMARY OF OPINIONS

21.   Based on my professional experience, education, and training, as well as my review of the documents provided to me in this matter, my opinions are as follows:

    a. **Opinion 1**: Mr. Schroyer did not follow the accepted steps in a DES study that are taught in basic courses on DES, thereby resulting in unreliable conclusions. Specifically:

        i.   Mr. Schroyer relied on flawed inputs received from Dr. Flores and Mr. Peters without independently verifying their accuracy.

        ii. Mr. Schroyer failed to use data that was representative of the California communities.

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iii.   Mr. Schroyer failed to properly validate his model.

iv.   Mr. Schroyer used a misleading measurement of "care time omitted" rather than actual "care omissions."

v.   Mr. Schroyer used varying degrees of granularity in his inputs.

vi.   Mr. Schroyer's use of the "Five Assessments" matching process led to thousands of residents and days of data being excluded from his analysis, making even his conclusions for the Six Communities unreliable.

vii.   Mr. Schroyer's calculations of averages to measure the alleged deficient between available and required care hours is misleading and unreliable.

b.   **Opinion 2**: Mr. Schroyer misrepresents the capabilities of a DES model.

VII.   **OPINIONS**

A.   **Opinion 1: Mr. Schroyer Did Not Follow the Accepted Steps in a DES Study, Thereby Resulting in Unreliable Conclusions**

22.   Based on my review of Mr. Schroyer's Declaration, deposition testimony, and the documents referenced therein, Mr. Schroyer failed to follow the accepted steps in a DES study. These steps are: Problem Definition, Project Planning, System Definition, Model Formulation, Input Data Collection and Analysis, Model Translation, Verification & Validation, Experimentation & Analysis, and Documentation & Implementation. Indeed, Mr. Schroyer committed numerous errors that are contrary to accepted simulation modeling and analysis practice. Examples include (a) improperly relying on flawed inputs received from Dr. Flores and Mr. Peters without independently verifying their accuracy, (b) failing to use data that was representative of the approximately 90 California communities, (c) failing to properly validate his model as is required when creating DES models, (d) utilizing a misleading measurement of "care time omitted" rather than actual "care omissions," (e) using varying degrees of granularity in the inputs, (f) using data that excluded thousands of residents and days, and (g) relying only on averages, which fail to capture what is happening on a day-to-day basis. These critical errors render any conclusions drawn from his DES model inaccurate and unreliable. In fact, if Mr.

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Schroyer were a student in my DES modeling and analysis class, he would receive a failing grade for the DES model that he created and analyzed in this matter.

        i.   **Mr. Schroyer Improperly Relied on Flawed Inputs Received from Dr. Flores and Mr. Peters, Without Independently Verifying Their Accuracy**

23.   DES modeling, like the one used in Mr. Schroyer's study here, begins with a variety of inputs into the model. The software then provides a variety of outputs based on those inputs. Inputs are, therefore, key and necessarily will be determinative of the outputs. The key inputs for Mr. Schroyer's analysis were (1) available staff time, (2) non-clinical staff time, (3) task times, and (4) the alleged service needs of the residents.

24.   It is crucial that the person conducting a DES study verify that the information being input into the model is valid, reliable, and accurate. Indeed, it is the job of a competent, responsible, and skilled DES simulator to challenge any data received from others to ensure that it is accurate, reasonable, and valid. If the DES simulator does not challenge any data received, the DES simulator is not exhibiting a level of professional competence. This, alone, can undermine the credibility of an entire study.

25.   [REDACTED]

26.   Mr. Schroyer's peer-reviewed article on using DES in the skilled nursing context likewise confirms these important principles. For instance, he and his co-authors reported that "DES

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does not involve creating mock data or predicting theoretical outcomes." John F. Schnelle, L. Dale Schroyer, Avantika A. Saraf, Sandra F. Simmons, *Determining Nurse Aide Staffing Requirements to Provide Care Based on Resident Workload: A Discrete Event Simulation Model*, Journal of the American Medical Directors Association at 971 (2016) (ECF No. 350-6) ("Schnelle 2016"). They further noted that DES is only useful if there is "accurate data about the required workload of a resident population." *Id*. And, they noted that "the advantage" of a DES analysis for conducting staffing projections "is that all of the input variables can be adjusted to reflect the work processes of a specific facility." *Id*. at 976 (emphases added).

27.   These points noted by Mr. Schroyer are part of the steps in a DES study, so he is aware of them.

28.   Yet, rather than apply the methods that he has used in the past and that he apparently understands, the inputs Mr. Schroyer used in his model were based on his seemingly blind reliance on the assumptions fed to him by Dr. Flores and Mr. Peters (*i.e.* task times, task frequencies, summaries of Defendants' data).

29.   Specifically, Mr. Schroyer relied on:

   a.   Dr. Flores' decision to narrow the staff involved in providing care to four defined categories – (1) Care Managers, (2) Medtechs, (3) LPNs, and (4) Care Directors (Supervisors) – and exclude all employees who do not fall under her definitions of any of these four categories. Schroyer Decl. at ¶ 46.

   b.   Dr. Flores' assumptions about how long each individual task should take. Schroyer Decl. at ¶ 51.

   c.   Dr. Flores' assumptions about how frequently each individual task should occur over a 24-hour period. Schroyer Decl. at ¶¶ 55-56.

   d.   Dr. Flores' assumptions regarding the schedules of care services and non-direct care/administrative staff activities. Schroyer Decl. at ¶ 57.

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e. Dr. Flores' assumptions as to how to bundle services (*i.e.* the grouping together of certain care services that can provided simultaneously to a resident or residents). Schroyer Decl. at ¶ 58.

f. Dr. Flores' assumptions as to how the line-item behavioral interventions by staff should occur in the logic of the DES analysis. Schroyer Decl. at ¶ 59.

g. Dr. Flores' assumptions regarding the priority inputs to dictate which task should be completed first when a staff member is confronted with two different tasks at the same time. Schroyer Decl. at ¶ 60.

h. Dr. Flores' definition of each task's care window – *i.e.* the time frame in which a care service is required to be performed in the DES modeling (if the task is not performed by the end of the care window, the task is deemed omitted). Schroyer Decl. at ¶ 61.

i. Dr. Flores' assumptions regarding how much time the Community's caregivers spend on a variety of non-caregiving tasks and assumptions that caregivers will prioritize nonclinical tasks over caregiving. Schroyer Decl. at ¶¶ 56-57; Schroyer Dep. 163:25 – 165:15.

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██ Instead, he blindly relied on the assumptions and decisions made by Dr. Flores. He did so even though he had data from which he could validate and/or corroborate her assumptions. ███████

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15 ████████ That alone, renders his DES model highly suspect, and his analysis and the

16 associated conclusions unreliable.

17   32.   Indeed, one of the inputs Mr. Schroyer relied on was the sequential assignment of

18 residents to rooms in the community that did not take into account the individual needs of the residents.

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22 ████████ This would likely lead to an

23 unreliable output – an artificially inflated time for escorting assistance. This further illustrates the

24 unreliability of his model.

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█████████████████████████████ Here, however, Mr. Schroyer did not rely on "objectively verifiable inputs." He did not rely on "clearly validated data." He did not require that he be shown that the inputs were valid or reasonable for his DES model. And he did not obtain data directly from any of the communities he analyzed such that his inputs are reflective of the actual work environment of the business being analyzed. Instead, his model was predicated almost exclusively on assumptions and guesses made by Dr. Flores. That is not consistent with accepted DES standards, and it renders his DES model invalid. It also renders any conclusions he derived from the model equally invalid and unreliable. Indeed, Mr. Schroyer's model is more a reflection of Dr. Flores' and Mr. Schroyer's assumptions about the behavior of the system (*i.e.* how care is provided to residents) rather than the reality of how the system operates.

ii.   Mr. Schroyer Failed to Use Data that was Representative of the California Communities

34.   As set forth in Dr. Saad's Declaration, sampling is a statistical procedure where a fraction of data is taken from a large set of data, and the inference drawn from the sample is extended to the whole group. Saad Decl. ¶ 79. Here, Mr. Schroyer failed to follow standard sampling principles when selecting the Six Communities. That precludes him from reaching any conclusions about the other 84 communities that I understand fall within Plaintiffs' class definition.

35.   As an initial matter, neither Mr. Schroyer nor Dr. Flores could provide a clear or consistent explanation as to how the Six Communities were picked. Mr. Schroyer stated that that he conducted his simulation only on days during a 3-year timeframe for which Defendants purportedly produced completed or substantially complete data. Schroyer Decl. ¶ 76; *see also* ████████

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████████████ This inconsistent and confusing testimony raises numerous questions about how the Six Communities were selected.

36.   ████████████████████

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███████████ In fact, the data he had for the Six Communities was determined to be *less* "complete" than the data provided for at least twelve (12) other communities (according the methods that were used for assessing the completeness of the data). *Id*.

37.   In any event, even assuming that the communities were selected on the basis of substantially complete data, Mr. Schroyer's explanation does not comport with the fundamentals of statistical sampling. If the Six Communities are indeed representative of all 90 California communities, the Six Communities must be selected using accepted random sampling principles. If not, the sample being tested may very well be biased and non-representative. ███████████████

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██████████████████████████████ Given that Mr. Schroyer did not follow well-established sampling principles when selecting the Six Communities, the Six Communities are highly unlikely to be representative of the entire population of communities. This is basic statistics.

38.   What is more, even assuming the Six Communities were chosen based on the most complete data available, using that as a basis for selecting the sample without further investigation into why that was the case would render the sample inherently biased and non-representative. Indeed, that does not constitute random sampling and it violates random sampling principles. Questions that have

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not been answered by Plaintiffs and Mr. Schroyer, despite direct questions, include: Why did these Six Communities have complete data using the methods Mr. Schroyer employed to evaluate the completeness of the data? What features in these Six Communities resulted in complete data? Why is it that the other communities did not have comparably complete data? Without investigating and answering these questions, one cannot conclude that the sample is representative of any other community.

39.   But even as to just the Six Communities, Mr. Schroyer's data selection methods call into question the reliance and applicability of his analyses. In particular, Mr. Schroyer excluded substantial amounts of the data he had for the Six Communities. ███████████████████████████████ ███ ██████████████████████████████████████ If the limited data that he used is not representative of the larger universe of data that he excluded, then it would not be reliable to use that data to reach conclusions even just as to the Six Communities themselves.

iii.   Mr. Schroyer Failed to Properly Validate His Model

40.   In any DES model study, it is critical that a simulator conduct adequate and appropriate validation of the model. ████████████████████████████████████ ███████████████████████████████ Yet, Mr. Schroyer failed to properly validate his DES model. This is yet another reason that the conclusions he drew are fundamentally unreliable.

a) Mr. Schroyer failed to conduct an external validation of his DES model.

41.   Where, as here, the system being modeled already exists, it is critical that a simulator validate the model by comparing its outputs with the actual system. *See* Averill M. Law, How to Build Valid Credible Simulation Models, 2009 Winter Simulation Conference, Dec. 13, 2009, at 24 (ECF No. 353-8) ("Law 2009"). This type of validation must be performed to ensure that the model is as close an approximation to the actual system being analyzed. Indeed, the most definitive test of a simulation model's validity is establishing that its output data closely resembles the output data that would be observed from the actual system." *Id*. at 30; *see also* David M. Eddy, et. al, Model Transparency and

Validation: A Report of the ISPOR-SMDM, Value in Health, 843, 845-46 (2012) (ECF No. 353-9) ("Eddy 2012"); *see also* Eddy 2012 at 847-48 (["E]xternal and predictive validation are critical as they most closely correspond to the model's purpose," and they are "used throughout healthcare … and, indeed, virtually every other scientific field."). In this respect, the DES model must mimic the behavior of existing system. If it does not, the model will not match the reality of actual system and therefore the conclusions drawn from the DES model output will be unreliable. In performing this type of validation, critical factors include "collect[ing] data on the performance of the existing system" and then comparing the "simulation model output data for the system with the comparable output data collected from the actual system." *See* Law 2009, at 24, 27.

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████████████████████████████████ Any one of these methods would be a feasible way to

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attempt external validation. But Mr. Schroyer made no effort to do so.

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██. Mr. Schroyer's contention is

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wrong and contradicts basic tenets of DES model validation. If one is using DES to make conclusions

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about a system that actually exists, it is well-accepted that the model behavior must match the behavior

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of the system being analyzed. Mr. Schroyer's apparent attempt to excuse his failure to conduct the

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requisite validation simply does not comport with accepted standards.

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45.   This is especially so given the extreme nature of his results. ████████████████

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[1] It is my understanding that the specific dates displayed in the charts are representative of any given day in the identified community and were not "cherry-picked."

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46.   Indeed, when confronted with such extreme results, the need for external validation is all the more critical.   But Mr. Schroyer made no attempt to determine if that was the case before baldly concluding that his model had generated accurate and reliable results.

47.   At bottom, Mr. Schroyer failure to conduct any external validation of his model renders any conclusions derived from the model wholly unreliable.

b) Mr. Schroyer failed to conduct any "face validation" of his DES model.

48.   A second critical type of DES validation is known as "face validity." Face validity is the extent to which a model "correspond[s] to current science and evidence, as judged by people who have expertise in the problem." Eddy 2012, at 846. Thus, "people who have clinical expertise should evaluate how well each model component reflects their understanding of the pertinent medical science, available evidence, and the clinical or administrative question at issue." *Id*. Stated otherwise, DES results should be reviewed "for reasonableness. If the results are consistent with how they perceive the system should operate, then the simulation model is said to have face validity." Law 2009, at 27.

49.   ███. Apparently, he never attempted to confirm his results with the "people who have clinical expertise," as required for a valid DES model. Eddy 2012, at 846. Of course, had he attempted to validate these findings with Dr. Flores, he would have realized his model lacked facial validity.

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█████████████ Mr. Schroyer referred to this study at his deposition and was apparently directly

involved in it. His failure to validate his findings against the scientific evidence available to him further

undermines the reliability of his DES model and the associated conclusions.

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█████████████████████████ As with his findings on alleged care time omissions,

this is an extreme result that should certainly have called for further investigation and validation. His

failure to do so only further underscores that he failed to follow the requisite methods required for any

reliable and accurate DES study.

              c) **Mr. Schroyer's alleged validation efforts are insufficient under accepted standards.**

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██████████████████████████ Yet, that is merely one, less

important component of DES validation – known as "internal validity." This type of validation involves

examining whether the calculations are performed correctly and are consistent with the model's

specifications. All that does is "help[] to ensure there are no unintentional computation errors." Eddy

2012 at 846. It "does not evaluate the accuracy of the model's structure or predictions." *Id.*

53. What is more, Mr. Schroyer did not even conduct this internal validation correctly. As set

forth in Dr. Saad's declaration, there are numerous mathematical and computational errors Mr. Peters

committed in creating the underlying databases on which Mr. Schroyer directly relied. Saad Decl. ¶ 109.

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54.   Mr. Peters' database containing the raw resident assessment data also contained critical flaws. ████████████████████████████████████

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████████████████████████████████████ Mr. Schroyer's

failure to identify Mr. Peter's numerous errors is indicative of that fact. At bottom, because the inputs Mr. Schroyer used in his model were contaminated by Mr. Peter's errors, the outputs from his model are equally contaminated. That renders any conclusions drawn therefrom inaccurate and unreliable.

iv.   Mr. Schroyer's Attempt to Measure "Care Time Omitted" Rather than Actual "Care Omissions" Is Flawed and Unreliable

56.   In a DES study, one must first define their objective (part of the Problem Formulation step). The objective of Mr. Schroyer's model was to estimate the time deficit between required and available care hours. But that objective is inherently flawed where, as here, one is assessing whether a community is providing adequate services to its residents or placing its residents at "a substantial and ongoing risk for not receiving required services." Schroyer Decl. ¶ 77. A flawed objective is prone to misrepresent what is occurring in the actual system, by not correctly measuring what is needed to capture the condition of the system.

57.   As an initial matter, DES can provide various types of "outputs" that go beyond merely estimating the existence of time deficits. *See, e.g.*, Sandra Simmons, et al., *Managing Person-Centered Dementia Care in an Assisted Living Facility: Staffing and Time Considerations*, The Gerontologist, 2017 (ECF No. 353-10) ("Simmons 2017"); Schnelle 2016. Indeed, DES can provide "outputs" that estimate deficits in actual care provided. By breaking down the care required by task type, resident, and staff type, Mr. Schroyer could have used his model to estimate the percentage of each task type not delivered to residents and the percentage of tasks not delivered by each staff type. This would be a much more accurate measure of whether residents are at risk of being deprived or have been deprived of necessary care.

58.   Instead, Mr. Schroyer looked solely at total care time omissions. But that is far too simplistic under the circumstances and obfuscates how the system actually operates. ██████████

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████████   Under those circumstances, even though there appears to be a deficit between the required and available care time, residents are still receiving all the care needs they require. This demonstrates why one cannot simply use a blunt measure of "omitted care time" to opine on whether residents were deprived (or were at risk of being deprived) of necessary care services. That measurement is therefore an unreliable basis for the broad conclusions Mr. Schroyer reaches in his Declaration.

v.   Mr. Schroyer Used Varying Degrees of Granularity in his Model

59.   Model granularity, or the level of detail that goes into a model, is a key attribute that results from how reality is abstracted into a model (part of the System Definition). Determining an appropriate granularity level for a particular purpose is a modelling choice that may have to be traded off with a number of other considerations.

60.   When constructing a DES model, the more detail that is inputted, the more likely it is that a DES model could introduce errors into the output analysis. The more errors in the DES model input, the more likely the output also contains errors and the associated conclusions unreliable. Moreover,

simultaneously using coarse and fine input data means that any errors in the model would be of differing orders of magnitude.

61.   Here, Mr. Schroyer failed to apply a uniform level of granularity to his model. Instead, he chose to use both coarse and fine input data. This not only introduces errors into his model, but it is prone to introduce errors that are of differing orders of magnitude. ████████████████

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[REDACTED]

65.   The effect that variable granularity has on the model is that errors on coarse inputs will be a different order of magnitude compared to the errors on fine inputs. The net effect of such mismatches will percolate through to the output analysis, leading to the potential for inaccurate and unreliable conclusions.

> **vi.   Mr. Schroyer's Use of the "Five Assessment" Matching Process Led to Thousands of Residents and Days of Data Being Excluded from the Analysis**

66.   In conducting his DES analysis, Mr. Schroyer compared the census numbers reflected in a document known as the "Labor Detail Reports" with the "census numbers derived from active resident assessments." Schroyer Decl. ¶ 42. If the comparison showed that either the assessment-derived census was higher than the census in the Labor Detail Reports or the census in the Labor Detail Reports was more than five (5) residents above the assessment-derived census, he excluded from his analysis all the data from that particular day. *Id.*

67.   [REDACTED]

68.   [REDACTED]

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vii. Mr. Schroyer's Calculation of "Average" Deficits Between the Available and Required Care Hours is Misleading and Unreliable

69.   Mr. Schroyer purports to calculate "average" deficits between the available and required care hours is misleading and unreliable. In particular, he states that one of his key findings is that "[o]n average, the selected facilities omitted 41.5% of the care time required to deliver resident care." Schroyer Decl. ¶ 31. He also relied on an alleged "average shortfall of staff hours per day," which was predicated on comparing daily averages for available care hours with daily averages for required care hours. Schroyer Decl. ¶¶ 88-89.

70.   Averages do not capture what is happening on a day-to-day basis. For example, a small number of highly skewed data points can shift averages. Averages provide an overall assessment of a system, but do not capture particular instances. For example, a fair die with six sides labelled one to six has an average roll of 3.5. Yet a roll of 3.5 can never occur. Thus, it is critical that when one calculates and reports on averages, he or she must also calculate and report on confidence intervals and standard deviations to provide a more complete picture of the range of possibilities. Confidence intervals represent a range of values over which a true population parameter falls with a certain probability. Standard deviations are used to calculate confidence intervals, representing a measure of uncertainty in data. In the event of large standard deviations in a model's output, DES can be used to track down the sources of those deviations, such as by building empirical distributions for the output data.

71.   ███

B. Opinion 2: Mr. Schroyer Misrepresents the Capabilities of a DES Model

72.   Mr. Schroyer has blatantly misrepresented the capabilities of his DES model. As a person who has been involved in the field of simulation for over 30 years, I find this both disturbing and disappointing.

73.   ██ To support his claim, Mr. Schroyer cites the

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error rate of the *software* – not the error rate of his *DES modeling*. Schroyer Decl. ¶ 73; Schroyer Dep. 39:23–40:12. In particular, he represents that the MedModel software has a known error rate of "one times 10 to the minus 59th power." *Id.* But Mr. Schroyer overstates the accuracies and capabilities of a DES model. In reality, the error rate for his specific model depends on the inputs provided to the system – it does not depend on the error rate of the software itself. Indeed, unless the DES model is simple (*e.g.* a simple queue at a single store register), it is impossible to assess an error rate to a DES model. The real question to be answered is: How useful is this model to providing insights to the system being analyzed? Mr. Schroyer's reliance on the software's known error rate as support for his DES model's accuracy misrepresents the accuracy of his DES model.

74.   Mr. Schroyer's blatant misrepresentation about the capabilities of DES modeling is a stain on this profession. It also appears to be intended to mislead the trier of fact into believing that his model is extremely accurate. In reality, his model is only as accurate as the inputs into and the validity of the model. Here, as discussed, the inputs are wildly inaccurate for a variety of reasons, and its validity to capture the actual systems is highly suspect. His model and its output are likewise inaccurate and unreliable.

VIII.   CONCLUSION

75.   In conclusion, based on my analysis of the documents provided to me in this matter, Mr. Schroyer's Declaration, Mr. Schroyer's deposition testimony, and the analysis conducted by Dr. Saad, it is my professional opinion to a reasonable degree of certainty that Mr. Schroyer's model is inaccurate and unreliable. Mr. Schroyer did not conduct a DES study and create a DES model in accordance with accepted standards, including because he (a) improperly relied on flawed inputs received from Dr. Flores and Mr. Peters without independently verifying their accuracy, (b) failed to use data that was representative of the California communities, (c) failed to properly validate his model, (d) used a flawed measurement of "care time omitted" rather than actual "care omissions", (e) used varying degrees of granularity in his inputs, (f) excluded thousands of residents and days of data from his analysis, and (g) used misleading calculations of averages. In addition, Mr. Schroyer misrepresented the capabilities of a DES model. This renders the conclusions he generated from his model unreliable.

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76.   This Declaration is based on the information and documents that were made available to me. I am in a position to render my opinion at this time based on such information and documents. I reserve the right to revise or expand my expert opinion to reflect information acquired after the date of this report or opinions expressed by other expert witnesses, if any, including, without limitation, documentary evidence and testimony provided by Plaintiffs, underlying evidence provided by defense counsel, or evidence that is introduced subsequent to this Declaration.

77.   I declare under penalty of perjury under the laws of California and the United States that the foregoing is true and correct.

Executed on March 3, 2022 in Urbana, Illinois.

Sheldon H. Jacobson

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